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ABSTRACT

Issues in student placement, particularly of economically disadvantaged gifted students, are addressed. After a brief review of the legislative history of efforts to identify and serve this population, the conceptual framework of two diverse theoretical positions, decision theory and justice as fairness, is examined. Decision theory is considered in terms of characteristics of the psychometric models of fair selection. Justice as fairness is contrasted with utilitarian values: a utilitarian framework equates maximizing utility in the aggregate with achieving equity. Justice as fairness theory does not equate the two, but emphasizes the effects of placement decisions on such basic liberties as self respect. (CL)

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NO. 56 UTILITY AND EQUITY IN STUDENT PLACEMENT

Stephen L. Murray

Research on Evaluation Program

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No. 56 UTILITY AND EQUITY
IN STUDENT PLACEMENT

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May 1981

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PREFACE

The Research on Evaluation Program is a Northwest Regional Educational Laboratory project of research, development, testing, and training designed to create new evaluation methodologies for use in education. This document is one of a series of papers and reports produced by program staff, visiting scholars, adjunct scholars, and project collaborators--all members of a cooperative network of colleagues working on the development of new methodologies.

How should special children (gifted, disadvantaged, handicapped) be assigned to educational programs? How does one assess the utility and equity of various placement strategies? In this paper, Steve Murray considers the nature of placement strategies under the utilitarian assumptions of decision theory, which treats utility and equity as identical and contrasts that view with an alternative view where considerations of justice as fairness leads to the position that utility and equity are not synonymous. These analyses illustrate approaches to integrating value considerations with technical considerations in insuring the equitable placement of children in educational programs.

Nick L. Smith, Editor
Paper and Report Series

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UTILITY AND EQUITY IN STUDENT PLACEMENT

Introduction

Evaluators are frequently enlisted to assist program personnel in developing strategies to select students for alternative educational programs. Low achieving students, gifted and talented students, low-income students and handicapped students are among those who are expected to benefit from such programs. Each program's selection strategy is based, in part, on the requirements of a particular legislative act and its supporting regulations. Independent policies governing selection strategies for federal and state programs serving different populations often lead to placement strategies that are a haphazard collection of distinct selection strategies.

The problem is exacerbated by the role that evaluators are generally expected to fill in developing selection strategies. Evaluators are construed as test and measurement experts who will help find the most suitable test and criterion for selecting students (cf. Lyon, 1978). The evaluator, as a measurement expert, is expected to judge instruments on the basis of their validity and reliability, which are taken to be properties of tests, a belief that further constrains the evaluator's role. The evaluator's potential contribution, however, goes considerably beyond that of the measurement expert. The properties of sound selection and placement strategies depend on the purposes to be forwarded by the programs available.

Selection and placement decisions are implicitly based on consensual or negotiated institutional and individual values. The value context must be taken into account in planning a sound

strategy. A good selection strategy should contribute to efficient, stable, and just institutions.

Recent years have evidenced increased emphasis on justice (equity) as a basic value to be sought in selecting students or placing them in educational programs. Particular conceptions of social justice have sometimes overridden conservative values of efficiency and stability. There are a number of illustrations of the concern for justice in selection and placement. Analysis of test bias in employment selection and academic selection reflect, in part, a concern for social justice. Fundamental concerns for justice are also expressed in the legislation for educational programs.

The basic topic addressed in this paper is the concept of justice as it impinges on the design of student placement strategies under compulsory education. To bring the ideas into a practical context, they will be discussed in relation to special programs for economically disadvantaged students. Particular emphasis is placed on selection of disadvantaged students for gifted and talented programs.

Equity Issues in Legislation

Since the mid 1960s federal and state incentives have encouraged educators to provide special educational services to children from low-income families. Title I of the Elementary and Secondary Education Act provides for supplementary educational services to low-achieving students from low-income families.[1] More recently, policy has provided for targeting services to the special education needs of students who are from low-income families and who have exceptional capabilities. The Gifted and Talented Children's Education Program was authorized under Section 404 of Public Law 93-380, The Special Projects Act. It was reauthorized by the Educational Amendments of 1978 (Public Law 95-561) as Title IX, Part A, of the Elementary and Secondary Education Act. Proposed regulations for the Department of Education's administration of the Act were published in the

Federal Register (June 25, 1979). The legislation and supporting regulations call on state and local education agencies to develop systematic procedures for identifying disadvantaged gifted and talented students from low-income families.

In 1977 forty-three states had specific policies guiding the education of gifted and talented students (Mitchell and Erickson, 1978). The policies of thirty states outlined requirements for identifying students. California's Gifted and Talented Program, for example, provides the policy basis for making gifted and talented programs accessible to a more diverse population of students than under the previously legislated Mentally Gifted Minor Program.

Broadly speaking, merging public concern for educating gifted and talented students with that for educating students from low-income families may be interpreted as a concern for justly distributing educational benefits. More specifically it assumes that traditional procedures fail to identify students from low-income families who stand to benefit from educational programs for gifted and talented students.

Toward a Conceptual Framework

Evaluators called upon to plan, develop, implement or appraise identification and selection procedures are obliged to deal with issues ranging from value conflicts to technical problems. Procedures implemented should achieve a reasonable balance in their approach to the issues involved. Creative solutions dealing with the constraints and meeting the requirements of a particular setting are necessary. Conceptual guidance may prove a useful starting point to evaluators. An ideal conceptual framework would suggest procedures which are self-correcting, that is, subject to checks of validity, acceptablity, and efficiency. This paper is a first step in explicating such a conceptual framework, drawing on two diverse theoretical positions, decision theory and the concept of justice-as-fairness (Rawls, 1971).

Decision Theory

Decision theory has been accessible to educational measurement and evaluation specialists since introduced by Cronbach and Gleser (1965) in 1957 and in revised form in 1965. Its theoretical form is well specified, and it has been applied to bias in selection, a problem closely related to fairness in identification and selection of students for gifted programs (cf. the Journal of Educational Measurement, Spring 1976).

The extent to which practice is congruent with theoretical prescriptions of decision theory is not well known. The concluding article in the special issue of the Journal of Educational Measurement, devoted to bias in selection, suggests that practice is influenced by more factors than have been captured by straightforward applications (Breland and Ironson, 1976).

Breland and Ironson (1976) analyzed data used in admissions to the University of Washington Law School in 1971. They found a far greater proportion of ethnic minority group members were admitted than would have been admitted by applying any of the competing psychometric models of selection fairness. The law school admitted 53% of the etnnic minority group members and 15% of the non-minority group members. At most, application of the psychometric selection models would have admitted 16% of the ethnic minorities with over 17% of the non-minorities being admitted.

While there were differences between the psychometric models (i.e. some models would have led to admitting more minority applicants than others), there was a much greater difference between the values inherent in the decision-making process of the committee and the psychometric models. In order to identify reasons for the discrepancy it will be helpful to examine the basic characteristics of the psychometric models of fair selection as these models can be generalized to the problem of fair placement. A selection process is characterized by the following elements:

1) Individuals (e.g. students) about whom selection decisions are to be made. That is, individuals who will be assigned to a select group

2) Information (about each individual) that is used in making the selection decision (regarding each individual)

3) A strategy by which the information is analyzed to reach a final selection decision (in the select group or not in the select group)

4) An outcome expressed as the individual's performance after assignment

5) Subpopulations for whom there is an a priori belief that different selection strategies may be necessary or who by virtue of public concern must be singled out to ensure all individuals are being handled fairly.

In the simplest selection situation it is assumed that there is only one possible "treatment". Individuals are either accepted to or rejected from the institution. Acceptance is determined on the basis of information (e.g. test scores) on each individual prior to their entering the institution. The objective is to accept those persons who will succeed and reject those who would have failed.

The soundness of any selection strategy is predicated on the availability of prior information regarding the relationship between the predictor and the criterion in an unselected sample. Analyses of the utility or the fairness of any selection procedure in accord with the psychometric models developed to date assume that an acceptable criterion is available. That is, they assume that the criterion score used is reliable, relevant, and an unbiased measure of the essential outcomes of the program involved. Omitting important outcomes will negate the soundness of the analyses.

A minimally acceptable level of performance on the criterion is established. Those persons falling above this level are designated successful and those below the level are designated unsuccessful. Similarly, a cutoff score on the predictor variable is established and applicants are accepted or rejected depending

on whether they fall above or below the cutoff score. Each of the psychometric models of fairness specifies a criterion of fairness. Based on the criterion of fairness, appropriate cutoff scores on the predictor variable is determined. These cutoff scores may vary according to the subpopulations. A detailed description, comparison, and appraisal of the psychometric models is provided by Petersen and Novick (1976).

A two-by-two table displays the relationship between these two variables in a form that is meaningful for analyzing a particular decision-making strategy.

FIGURE 1

	Successful	False negatives C	True positives A
Criterion			
	Unsuccessful	True negatives B	False positives D
		reject	accept
		Predictor	

Under the simplest condition the objective is to minimize the proportion of errors in deciding who to accept and who to reject. Using the cell frequencies in Figure 1, the ratio to be minimized is:

$$\frac{C + D}{A + B}$$

The size of this ratio depends on three variables: the location of the predictor cutoff, the location of the criterion cutoff, and the validity coefficient relating the predictor to the criterion. The location of the predictor cutoff is often constrained by a fixed selection ratio. The selection ratio is the number of position openings to the number of applicants. For example, if there are 10 positions in a particular program, and the number of applicants is 100, then the selection ratio is .10.

Selecting students in educational programs for the gifted is often constrained by implied selection ratios. A policy that calls for admitting only the top 5% of the students in a particular state or district translates into a selection ratio of .05. A very low selection ratio can effectively reduce the number of false positives (students who would have been accepted and failed), given a valid test. However, the number of false negatives (the students who were rejected but who would have succeeded) is increased as the selection ratio diminishes.

Regardless of the number of predictor variables used or the means by which the predictor variables are combined to support a final decision, extremely low selection ratios result in increased utility of decisions only if one ignores the opportunity costs associated with turning away large numbers of students who would have succeeded in the program.

The less valid the predictor and/or the greater the relationship between the predictor and one's level of disadvantage (as reflected by group status, socioeconomic status, etc.) the more severe the equity problem. That is, a number of the false negatives may be disadvantaged. If the predictor variables are not as valid for the disadvantaged groups, then the problem is compounded.

Cronbach (1976) has pointed out the varied implications of differences in the payoff associated with each of the cells in the 2 x 2 matrix. That is, once utilities have been assigned to each of the cells in the matrix, decision strategies can be derived. For example, a conventional assignment of utilities for employment selection would result in a payoff matrix in which only those who are hired and who succeed are given a positive utility. All others would be assigned zero utility to the organization. The decision rule maximizing utility would be favored.

The point to be stressed is that examining the characteristics of a predictor (e.g. test) outside of a decision context does not provide an adequate basis for assessing the utility of that test in selecting students or in assessing the

"fairness" of the test. Prior information regarding the relationship between the predictor and the criterion, the selection ratio, the cutoff score on the criterion, and the "costs" associated with false negatives and false positives must be established in order to justify decisions.

The paradigm presented in the previous paragraphs sketches the application of a decision-theory approach to selection. Selection implies that those rejected are simply not admitted to a job or an institution of higher education. In essence, the institution has no further responsibility for those rejected.

Educational institutions are generally assumed to be responsible for providing the most appropriate education available to all students within resource constraints. The type of decision being made in educational institutions is typically a placement decision. Test scores and other information are used to assign students to treatment A, treatment B, etc. The overall objective is still to maximize utility, but in terms of placement there is no logical necessity to have a fixed quota (i.e. selection ratio).

An empirical foundation for a sound placement strategy would require evidence regarding the probability of success in each alternative treatment, given individual status on some predictor variables. In order to address fairness of placement it would be necessary to examine subpopulation membership as it may affect the benefits to be derived from any particular treatment. Formal models for expressing optimal placement can be derived from Cronbach and Gleser (1965). Those models are relatively complex and require empirical information which is not readily available.

The value system underlying the psychometric models is utilitarian. The objective of a decision-making strategy under utilitarian principles is to maximize the expected aggregate utility derived from decisions. For example, we might take achievement gain in a specific academic area (e.g. mathematics) to be the desired outcome of a program for gifted students. Assuming that the metric used to measure achievement gain is linearly related to the value placed on the gain and is an

interval scale, the better of two decision strategies is that which results in the greater achievement gain for the selected and unselected group, provided the costs of the two strategies are equivalent. The selected group receives the alternative treatment and the unselected group receives the regular school mathematics courses. Alternative treatments designed for gifted students typically involve enrichment activities or acceleration of the student through the regular program and beyond.

There are two key points to be made regarding the usual application of maximizing the aggregate utility of decision strategies. The first point is that the same outcome, in qualitative terms, is appropriate for evaluating alternative programs to which two different groups are assigned. Such an expected outcome may involve a higher level construct such as mathematics achievement gains, which is assumed to extend across a wide range of performance and which satisfies assumptions of an interval scale. A scale with interval properties would allow one to average gains across both the selected and unselected groups, which relates to the second point. The placement strategy which results in the highest average achievement gain across the selected and unselected group is the preferred strategy. A placement strategy could consist of any of a number of possibilities, including identifying all students for one of the two available treatments should it be expected that the same program works best for all students. The reigning assumption in targeted programs is, however, that different students should get different treatment.

As a corollary to the second point and consistent with the principle of maximizing expected aggregate utility, small gains or even losses by some could be offset by large gains by others. This implies that it is acceptable for some students to be expected to fail to benefit from either of the two program alternatives as long as some students gain enough to cancel out the losses. Thus the key utilitarian principle, as applied, is intuitively vulnerable to criticism based on justice or equity concerns. Is it just to shift educational resources to maximize

aggregated utility? The utilitarian school of thought would say yes; maximizing utility and fairness are taken to be identical.

Justice as Fairness

An alternative value system may better reflect the concern that disadvantaged students are under-represented in gifted and talented programs. The implications of such a system for identifying students for gifted programs calls for analysis.

An alternative value perspective is offered by Rawls's (1971) theory of justice. Its significance to evaluators is that it deals with problems of fairness in relation to the distribution of resources, and it conflicts in significant ways with utilitarian values. Evaluators are intimately involved in resource allocation because of their role. House (1976) and Strike (1979) have argued that Rawls's work deserves the attention of evaluators. House (1976) sees direct implications for the details of program evaluation. Strike (1979) sees the implications as a means of sharpening the sensitivity and intuitions of evaluators to issues of justice. Both believe the concept of justice-as-fairness, if incorporated into the domain of evaluation theory, would help in understanding complex value issues often ignored by evaluators or social policy analysts. Thus, the potential of Rawls's theory is that it will allow reasoned treatment of value considerations not yet adequately handled by technical analyses. Interestingly enough, the same arguments have been made for the application of decision analysis in its broadest sense (Cronbach and Gleser, 1965; Keeney and Raiffa, 1976).

Rawls's (1971) theory is based on two major principles.

First Principle

> Each person is to have an equal right to the most extensive system of equal basic liberties compatible with a similar system of liberty for all.

Second Principle

Social and economic inequalities are to be arranged so that they are both:

(a) to the benefit of the least advantaged, consistent with the just savings principle, and
(b) attached to offices and positions open to all under conditions of fair equality of opportunity.

Application of these principles is based on a priority order. The first principle takes priority over both parts of the second principle. No just institutional practice can detract from the basic liberties of some in order to extend the basic liberties or provide social or economic benefits to others. An institution that condones constraining basic liberties of some in order to further the social or economic condition of others is unjust, even though the social or economic benefits to its members may be greater in the aggregate as a result of the constraint. Even though the first principle is satisfied within an institution, justice is still an issue in the distribution of social or economic benefits. Part (b) of the second principle, the opportunity principle, requires open access to compete for offices or positions which carry specific social and economic benefits (e.g. prestige, pay). Finally, where it is necessary to distribute benefits unequally, the difference principle requires that they be distributed to the benefit of the least advantaged.

Rawls's theory of justice, also called justice-as-fairness, is captured, however abstractly, in these two principles. Social institutions act fairly (justly) when these principles are followed, and unfairly (unjustly) when they are violated. The concept of justice-as-fairness is in contrast to a traditional utilitarian ethic which asserts "the greatest good for the greatest number". The greatest good for the greatest number is defined as the sum of satisfaction divided by the number of people in the population. Utilitarian ethics calls for maximizing the average utility as a moral obligation. The ends justify the means. Utilitarian ethics places high priority on efficiency and technological values within social institutions.

If the activity of the organization extracts a cost in either economic or social terms then the cost is deducted from the final aggregate satisfaction. Justice-as-fairness demands basic liberties be considered inviolate; not subject to increasing efficiency or maximizing aggregate utility.

Within the justice-as-fairness framework the most important basic liberty is self-respect. Self-respect involves two aspects. First, self-respect consists of "a person's sense of his own value, his secure conviction that his conception of his good, his plan of life, is worth carrying out. And second, self-respect implies a confidence in one's ability, so far as it is within one's power to fulfill one's intentions" (Rawls, 1971, p. 440). Self-respect cannot be bargained away (or taken away) for economic or social goods. A society which arranges its institutions to permit or encourage such tradeoffs is by definition unfair.

Rawls (1971) limits his treatment of justice to the basic structure of society. Strike (1979) reminds us of this limitation, emphasizing that program evaluation practice cannot simply be deduced from Rawls's theory of justice. At the same time an understanding of justice-as-fairness may serve to heighten the awareness of evaluators to value perspectives underlying concerns expressed about particular educational programs. One such concern is that programs for gifted students may result in an educational elite denying opportunities to some students because of their disadvantaged state. This concern, narrowly construed, can lead to a policy of providing "identical educational experiences" to all students (Gallagher, 1979). Better understanding of the concern may lead to adapting evaluation practices, including methods of identifying students and selecting outcomes to be assessed and an increased capacity to communicate information about the worth of educational programs in terms meaningful to policy makers.

Implications

The issues raised at the beginning of this paper are relevant at every level of policy making and decision making in the educational system. Placement strategies reflect values of utility and equity. A utilitarian conception of equity equates maximizing utility in the aggregate with achieving equity. Under the theory of justice-as-fairness, achieving equity is not assumed to be equated with maximizing utility. One must give attention to the effects of placement decisions on basic liberties such as self-respect. The strategy with the least unfavorable (or the most favorable) effect on the self-respect of both those accepted and those rejected would be preferred. More importantly, should a strategy evidence negative effects on the self-respect of members of a particular group, then creating a remedy for the injustice, would be a basic responsibiity of the institution.

A basic assumption underlying either approach to incorporating utility and equity concerns in a placement strategy is that we have a priori knowledge of the differential effects of various educational program alternatives for all significant groups. Another way to put the assumption is that we can draw generalizations from research that would provide the rationale for particular decision strategies.

In reality such a priori knowledge is not readily available. Uncertainty calls for careful evaluation of the decision-making processes involved in developing and implementing education programs. A conservative strategy of placement, for example, would allow for multi-stage decision-making. Preliminary decisions could be made about the best "placement" for a student. These decisions would be revisited to make sure that they were in the best interests of the individuals in terms of building their self-respect and their capabilities.

The operation of the program would be examined in terms of its influence on the self-respect of participants and non-participants. What might be done to build self-respect of all in the day-to-day operation of educational programs would be

considered. Process evaluation could focus on operational effects of the program.

Finally, summative evaluation would attend to the accumulated influence of a program on self-respect and its distribution among groups, as well as other performance and skills.

This paper began with a discussion of placing students in educational programs. How did it end with a discussion of program evaluation? A basic assumption in placement is that greater overall benefits will be derived if differential educational experiences are provided to students. Evaluating placement decision strategies requires evidence about program effectiveness for different types of students and assessments of the effects of multiple programs on entire populations of students. The usual approach is to examine effects on achievement.

Providing equitable educational experiences could, in theory, also be examined empirically. Such investigations may not meet the same standards of inferential rigor as studies examining effects on achievement. There are complex measurement issues to address in examining equity. In principle, however, judgments of equity and utility in placement could be more data-based whether a utilitarian or justice-as-fairness conception is used to define what is equitable.

Footnotes

[1]Federal legislation governing the use of federal funds in education is slated for major revisions as this paper is being written. While the structure of the ESEA Act of 1965 will be replaced by a new act, fundamental concerns for justice and program development will not disappear.

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